REMARKS

Responsive to the outstanding Office Action, applicant has carefully studied the Examiner's rejections. The claims pending in this application are claims 10-20. In the response, paragraph [0027] of the specification was amended and the claims were not amended. It is respectfully submitted that no new matter was added in this amendment. Favorable reconsideration of the application in light of the following detailed arguments is respectfully requested.

OBJECTIONS AGAINST THE DRAWINGS

The drawings were objected to in that reference numeral 17 was present on figure 2, but was not discussed in the specification, and reference numeral 10 was discussed in the specification but was not shown on figure 2.

In response thereto, the specification has been amended to remove reference numeral 10 and to substitute reference numeral 17, therefore making the drawings and specification consistent. It is therefore submitted that no changes to the drawings need to be made in light of this correction.

In light of the above, reconsideration and withdrawal of the objection are respectfully requested.

REJECTION OF CLAIMS UNDER 35 USC §103

In the outstanding Office Action, the Examiner rejected claims 10-20 under 35 USC §103 as being unpatentable over WO 96/33150 in view of US 5,321,192 to Cottrell. The Examiner states that the WO reference discloses a process for

converting alkanes to alkenes comprising contacting the alkane with a dehydrogenation catalyst under conditions sufficient to produce alkene and hydrogen, contacting the effluent with an oxidation catalyst and oxygen, and contacting the effluent with a dehydrogenation catalyst to convert unreacted alkane to additional quantities of alkene and hydrogen. The Examiner acknowledges that the WO reference fails to disclose adding water to the effluent. The Examiner then cites the Cottrell reference to show the use of water in dehydrogenation process. The Examiner states that it would have been obvious to modify the WO process with the water addition of Cottrell.

The Examiner's attention is first directed to paragraph 0008 of the application as filed which discusses the WO reference.

> The disadvantage of the process [referring to the WO reference] is that the addition of oxygen and the exothermic oxidation of hydrogen lead to very high temperatures, which reduces the selectivity of the downstream catalytic dehydration. This particularly applies to isothermic dehydration in the first step because in the case of adiabetic dehydration carried out in the first step, the temperature drop occurring in the catalyst bed causes an input temperature towards the SHC step that is lower than that in the case of isothermic dehydrations.

In light of this disadvantage of the primary reference, the combination of this reference with Cottrell does not yield the same process as the present invention. Cotrell utilizes a constant water feed before the first and second process steps (shown in claim 1 (e)). This means that it is not possible to control temperature by variation of the amount of water injected. Instead, if these two references were combined, temperature could not be controlled by standard heat exchangers, it will be necessary to control the temperature through a more complicated system, e.g.

through fired heaters between the first and second process steps. In order to maintain a preferable set point for inlet temperatures for the process steps, temperature control means would have to be utilized to control the heat added through these heaters. This process would be more complicated and less economical than the claimed invention.

The present invention, as claimed avoids this problem through the insertion of both water vapor and liquid water as shown in the second step of claim 1:

- subsequently the reaction mixture obtained in the first step is mixed with liquid phase water and water vapor as well as with an oxygen-bearing gas;

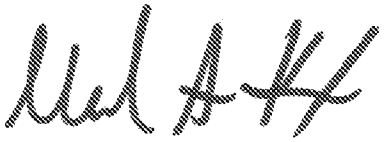
Nothing in the Cottrell reference teaches or suggests the use of water in both the liquid state and the gaseous state; therefore no reasonable combination of the applied references can show this claimed feature. This feature provides a simpler and more economical process than the proposed combination of the applied references, as the entire range of desired reaction conditions can be controlled through both the total amount of water added, in addition to the relative amounts of liquid and vapor.

In view of the above, it is respectfully submitted that independent claim 11 distinguishes over the applied art of record. Claims 11-20, which depend directly or indirectly from independent claim 11, are believed to be allowable based, at least, upon this dependence.

SUMMARY

It is believed that the above amendments place the application in condition for allowance. Should the Examiner wish to modify the application in any way, applicant's attorney suggests a telephone interview in order to expedite the prosecution of the application.

Respectfully submitted,



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